

L O C A L
I M P R O V E M E N T
I N
S C I E N C E
A C H I E V E M E N T

**Tips from Missouri Teachers
for
District/Building Administrators
and
Classroom Teachers**

INTRODUCTION

In July, 1998, the *Science Achievement Levels* were set for the Missouri Assessment Program. As a result of the levels set for the Intermediate and Secondary school, most District Reports had a low percent of students scoring in the “Proficient” and “Advanced” categories (Intermediate Level, about 11%; Secondary Level, about 6%). The teachers and people from industry who set these levels insist that the content and process standards for “Proficient” or “Advanced” are attainable and needed by all students. The Department sought input from representative constituents of Missouri districts to develop a document that will help districts and teachers enable students attain the “Proficient” or “Advanced” categories. This document is a compilation of ideas and tips that were generated through state-wide meetings.

DISTRICT/BUILDING LEVEL ADMINISTRATORS

SYSTEM

- Develop incentives based on student improvement at the grade level tested.
- Use standards-based science portfolios that could be passed along with promotion of students.
- Reinforce that the results of the test is an accumulation of skills developed all through the school years and that every teacher is responsible—not just teachers of grades 3, 7, and 10.
- Building and district administrators need to take a more active part in DESE meetings and curriculum meetings so as to be aware of what standards the teachers and students are trying to meet, and the policies governing them.
- Make science important--hire quality science teachers and keep them.
- Use block scheduling to allow for learning styles of all students.
- Develop a network for disseminating information to classroom teachers so they feel a part of a “team” approach to student achievement.
- Use test scores for their intended purpose - to assess student progress, not teacher effectiveness.
- Assure that administrators who are responsible for teacher evaluation are well-trained in inquiry-based pedagogy.
- Work to provide funds for hiring a science facilitator who can provide necessary guidance to develop scope and sequences, evaluate teaching practices and re-write curriculum/assessment. If districts cannot afford such a person, form a consortium with other districts to share one.
- The testing environment should be as ideal as possible to ensure maximum student responses:
 1. Test students in small groups (25 or less).
 2. The subject area teacher should administer the MAP test for their subject area specialty.
 3. Breakfast or snacks could be given to students before testing sessions.
 4. The entire testing window should be utilized, giving a day or two to rest in between each testing session, allowing for student make-ups.
 5. Temperature, lighting, etc. should be at optimal settings.
 6. All needed manipulatives (charts, calculators, rulers, etc.) should be provided and ready for all students.

PROGRAM

- Use NCR paper so teachers can grade part of the MAP as a class grade.
- Be protective of science facilities so equipment and materials are not misused.
- Provide extra staffing, smaller classes and assistant/aides to science teachers, especially for lab work.
- Students should take a grade-level MAP-type test at the end of each year and counted for a grade.
- Support science with necessary materials/classrooms/equipment. Upgrade science equipment and facilities.
- Provide funds for extra-curricular science activities and teacher training in science inquiry techniques.
- Strengthen the K-3 science curriculum to better prepare students for more in-depth study in grades 4-7 and 8-10.

COLLABORATION

- Share released items with parents; help parents interpret test results.
- Form regional science consortiums with other schools to share resources, equipment, curriculum, inservice, ideas, networking opportunities.
- Promote communication between school, community and particularly parents, explaining the purpose and change in focus of the MAP.
- Encourage the establishment of regional share centers (to share equipment, ideas, curriculum, etc.).

PROFESSIONAL DEVELOPMENT

- Develop a scope and sequence to coordinate with MAP (by grade level).
- Develop a K-12 articulated curriculum that is used by all teachers in the district. This would encourage a team effort and promote integration across curriculum.
- Design curriculum development opportunities for teachers within grade levels as well as K-3, 4-7, 8-12.
- Give new science teachers release time to observe in other classes; provide mentors who are master teachers of science.
- Get involved with state MAP program and re-scoring of MAP tests.
- Encourage teachers to join professional organizations.
- Provide in-service training that focuses on instructional strategies, especially inquiry-based teaching.
- Support classroom teachers financially in their pursuit of proficiency.
- Work with Regional PD centers to develop a list of qualified trainers to conduct in-service to meet district needs.

- Develop in-house teacher exchange programs so teachers can learn from each other.
- Establish and maintain contacts with professional organizations and Missouri Regional Professional Development Centers.
- Allow more time for teacher training.
- Work with Regional PDC to develop a list of qualified trainers to conduct in-service to meet district needs.
- Allow release time for new teachers to visit classrooms where outstanding teachers are practicing.

CLASSROOM TEACHERS

EMPHASIZE THINKING SKILLS

- Assign the “thinking” questions at the end of the chapter.
- Use inquiry techniques emphasizing critical thinking skills.
- Use Internet activities that tie into teaching units.
- Use “thinking” questions with open-ended answers.
- Ask students “Why?” “Explain your answer?” “How do you know?” “Why is it important?” “Who, What, When, Where, Why?” “What if.....?”

WRITE! WRITE! WRITE!

- Find current event articles and write about the science in them. Have students diagram as much as possible (concept mapping, webs, pictures, cycles, graphs, chart, etc.).
- Make more materials available about writing in the content areas.
- Do technical writings (reflections, experiments, scorings, diagrams and explanations, etc.).
- Have a “Question of the Week”—all students answer, class critiques a few of the answers (no names) and then try to write a better answer.
- Read a science article and then have the students respond about the science involved.
- Do journal writings—explanations, responses to learning, daily writing to neighbor, parents, “phantom of the lab.”
- Use questions from lower-level science texts to get less talented students to write.
- Write answers to questions as if addressing a non-scientist.
- Reduce the use of pronouns in answering questions

CURRICULUM ISSUES

- Encourage the use of environmental education curriculum as a method of integrating the sciences (i.e., Project WET, Project WILD, Project Learning Tree, etc).
- Make curriculum more problem-based, locally and personally relevant.
- Teach fewer units but teach them well and in-depth.
- Design 8th - 10th grade curriculum as a sampling of physics, chemistry, earth science, and life science.
- Help grade K-3 teachers strengthen their science curriculum.

PARENT INVOLVEMENT

- Use/design take-home investigations that parents do with their children.
- Have students take home experiments done in class and write the parent's response to the activity.
- Have a weekend science fair for parents; let the students design and present.

STRATEGIES

- Teach about, and increase the use of, cooperative learning groups.
- Improve classroom questioning techniques (Example: Socratic questioning, discussions).
- Participate in science programs: Olympiads, Science Fairs, Jr. Academy, Future Problem Solving, Wheels-in-Motion, Project WET, Project WILD, Project Learning Tree.
- Use a variety of instructional strategies to reach all students.
- Have students interpret graphs, diagrams and charts from newspapers, articles. (Example: USA Today, Newsweek)
- Teach science processes as an integral part of the science curriculum not as a separate unit.
- Use science terminology all the time in the classroom so students become very familiar with terms.
- Promote, as a teacher, long-term inquiry activities that takes weeks/months.
- Model problem solving/inquiry skills.
- Teach concepts not test items.
- Use internet to come up with ideas on how to teach a concept.
- Think Globally!!!
- Be enthusiastic!!!!
- Let students know **why** we want them to know and do certain things.
- Ask more "what if---" questions.

COLLABORATION

- Form grade 4 - 7 and 8 - 10 teams to network and share materials, equipment, ideas, etc.
- Develop interdisciplinary activities with peers.
- Coordinate and communicate among grade levels.
- Work with nearby school districts/colleges/universities to pool resources .

TEST-TAKING STRATEGIES

- Practice test taking skills: list, label, explain, write complete sentences.
- Teach students to answer all parts of a question - thoroughly.
- Have 10th grade students work the 7th grade released items for practice .
- Participate in MAP scoring process.
- Teach students to answer questions asked; don't allow "close" answers.
- Teach students to eliminate the use of pronouns in answering test questions.
- Make your assessments look like the MAP assessment.
- Put ideas for performance events with scoring guides in a binder or on a web-site.
(Check <http://www.successlink.org> for performance event ideas)
- Share performance tasks with teachers in the district.
- Give practice performance questions and score each others' papers (peer editing).
- Have resources available on test-taking skills.